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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/769,554	01/30/2004	Chien-Min Sung	21154.DIV	5868
20551	7590	11/21/2006	EXAMINER	
THORPE NORTH & WESTERN, LLP. 8180 SOUTH 700 EAST, SUITE 200 SANDY, UT 84070			PIZARRO CRESPO, MARCOS D	
			ART UNIT	PAPER NUMBER
			2814	

DATE MAILED: 11/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/769,554

Applicant(s)

SUNG, CHIEN-MIN

Examiner

Marcos D. Pizarro-Crespo

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 October 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 5, 7, 11-15 and 20-30 is/are pending in the application.
- 4a) Of the above claim(s) 2, 3 and 22-30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 5, 7, 11, 15, 20 and 21 is/are rejected.
- 7) ☒ Claim(s) 12-14 is/are objected to.
- 8) ☒ Claim(s) 1-3, 5, 7, 11-15 and 20-30 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Attorney's Docket Number: 00802-21154.DIV

Filing Date: 1/30/2004

Claimed Priority Date: 10/11/2002 (Divisional of 10/270,018)

Applicant(s): Sung

Examiner: Marcos D. Pizarro-Crespo

DETAILED ACTION

This Office action responds to the amendment filed on 10/30/2006.

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after the final rejection mailed on 7/26/2006. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/30/2006 has been entered.

Acknowledgment

2. The request for reconsideration filed on 10/30/2006, responding to the Office action mailed on 7/26/2006, has been entered. The present Office action is made with all the suggested amendments being fully considered. Accordingly, pending in this Office action are claims 1-3, 5, 7, 11-15, and 20-30.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 5, 7, 11, 15, 20, and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Ishikawa (WO 01/48816).

5. Regarding claim 1, Ishikawa shows most aspects of the instant invention including a method of making a diamond-composite heat-spreader comprising the steps of:

- Providing a first plurality of diamond particles having a first average mesh size (see, e.g., pp.26/II.24-26)
- Packing the diamond particles such that each of the particles is substantially in diamond-diamond contact with at least one other particle (see, e.g., pp.27/II.2-6)
- Providing an interstitial material including Ag, Cu, Al, Si, or BNi₂ (see, e.g., pp.27/II.9-13)
- Infiltrating the interstitial material into the particles in a vacuum furnace at a pressure below about 10⁻³ torr, thereby bonding the particles by the interstitial material with the interstitial material at least partially filling any voids between the particles (see, e.g., pp.17/II.9-13)

6. Regarding claim 5, Ishikawa shows that the infiltration is performed at a temperature below about 1,100°C (see, e.g., pp.17/II.9-13).
7. Regarding claim 7, Ishikawa shows packing the diamond particles to over 50% by volume of the spreader prior to providing the interstitial material (see, e.g., pp.4/II.14-16).
8. Regarding claim 11, Ishikawa shows that the particles contact one another sufficiently to provide a continuous diamond-to-diamond path to substantially each of the particles (see, e.g., fig. 1).
9. Regarding claim 15, Ishikawa shows that the particles have a size of from about 18 mesh to about 400 mesh (see, e.g., pp.4/II.10).
10. Regarding claim 20, Ishikawa shows the interstitial material is selected from the group consisting of Al, Cu, Ag, and mixtures or alloys thereof (see, e.g., pp.26/II.7-9).
11. Regarding claim 21, Ishikawa shows the interstitial material is a Si alloy of a member selected from the group consisting of Ni, Ti Al, and Cr (see, e.g., pp.13/II.13-20).

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 1, 11, 15, 20, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishibayashi (JP 9-312362) in view of Sung (US 6193770).

14. Regarding claim 1, Nishibayashi shows most aspects of the instant invention including a method of making a diamond-composite heat-spreader comprising the steps of:

- Providing a first plurality of diamond particles having a first average mesh size (see, e.g., fig.1 and pars.0011,0019)
- Packing the diamond particles such that each of the particles is substantially in diamond-diamond contact with at least one other particle (see, e.g., fig.1)
- Providing an interstitial material including Ag, Cu, Al, Si, or BNi₂ (see, e.g., par.0024)
- Infiltrating the interstitial material into the particles in a vacuum furnace thereby bonding the particles by the interstitial material with the interstitial material at least partially filling any voids between the particles (see, e.g., pars.0020,0024)

15. Although Nishibayashi uses a vacuum furnace during the infiltration step, he fails to specify the pressure. Sung, on the other hand, teaches that pressures below 10^{-3} torr would allow controlling the environment for infiltration to provide superior performance (see, e.g., Sung: col.13/ll.20-30).

16. It would have been obvious at the time of the invention to one of ordinary skill in the art to infiltrate Nishibayashi's metal at a pressure below 10^{-3} torr, as suggested by Sung, to provide superior performance during the infiltration step.

17. Regarding claim 11, Nishibayashi shows the diamond particles contact one another sufficiently to provide a continuous diamond-to-diamond path to substantially each of the particles (see, e.g., fig.1).

18. Regarding claim 15, Nishibayashi shows the particles having a size of from about 18 mesh to about 400 mesh (see, e.g., par.0019).

19. Regarding claim 20, Nishibayashi shows the interstitial material is selected from the group consisting of Al, Cu, Ag, and mixtures or alloys thereof (see, e.g., par.0021).

20. Regarding claim 21, Nishibayashi shows the interstitial material is a Si alloy of a member selected from the group consisting of Ni, Ti, Al, and Cr (see, e.g., par.0021).

Allowable Subject Matter

21. Claims 12-14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

22. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

23. Papers related to this application may be submitted directly to Art Unit 2814 by facsimile transmission. Papers should be faxed to Art Unit 2814 via the Art Unit 2814 Fax Center. The faxing of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (15 November 1989). The Art Unit 2814 Fax Center

number is **(571) 273-8300**. The Art Unit 2814 Fax Center is to be used only for papers related to Art Unit 2814 applications.

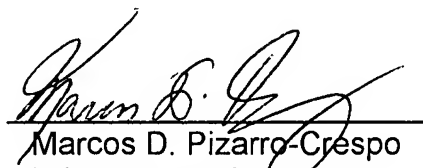
24. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Marcos D. Pizarro-Crespo** at **(571) 272-1716** and between the hours of 9:00 AM to 7:30 PM (Eastern Standard Time) Monday through Thursday or by e-mail via Marcos.Pizarro@uspto.gov. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy, can be reached on (571) 272-1705.

25. Any inquiry of a general nature or relating to the status of this application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Art Unit: 2814

26. The following list is the Examiner's field of search for the present Office Action:

Field of Search	Date
U.S. Class/Subclass(es): 438/15,25,26,51,55,64,105,106,122,584,FOR413	11/14/06
Other Documentation: PLUS Analysis	4/26/05
Electronic Database(s): EAST (USPAT, EPO, JPO)	11/14/06


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